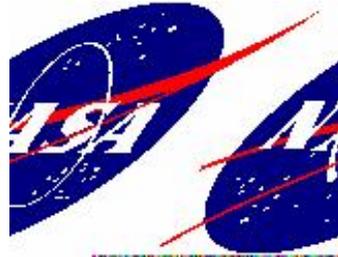


NEO

NASA Earth Observations



MODIS Science Team Meeting
March 22, 2005

Kevin Ward
kevin_ward@ssaihq.com

David Herring
dherring@climate.gsfc.nasa.gov



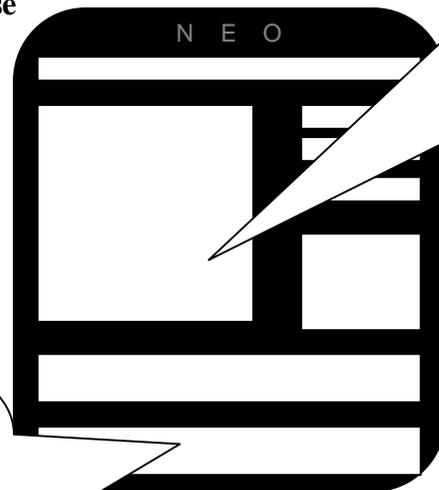
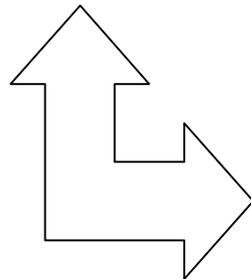
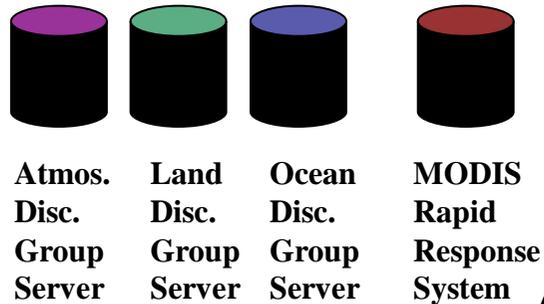
What Is NEO?

Web-based application and infrastructure to provide formal & informal educators a simple interface for search & retrieving NASA remote sensing imagery & data.

- | **Prototype commissioned by Vince Salomonson**
 - | “How to increase the use of MODIS imagery/data”
- | **Work started Fall 2003, continuing through December 2005**
- | **Acknowledgments:**
 - | Atmosphere Group (Bill Ridgway, Mark Gray)
 - | Ocean Group (Norm Kuring, Gene Feldman)
 - | Land Group (Jacques Descloitres)

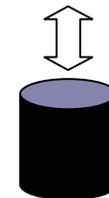
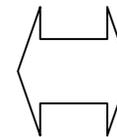


System Overview

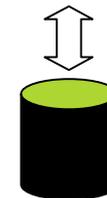


NEO Browse. Browse images are produced, stored, and made accessible by different servers. The prototype NEO server will interface routinely with each of these servers to retrieve the desired images for storing, indexing and display. Additional browse images also available from ECHO.

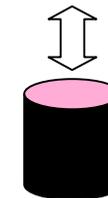
Data Ordering. NEO will shake hands with the ECHO System, which provides an inventory of NASA's data collections & Client API's for ordering data. Thus, ECHO serves as a portal to the DAACs where MODIS data are archived.



GES DAAC



LP DAAC



NSIDC DAAC



Why do we need NEO?

- | **According to findings from the Nov. 2004 NASA Earth Explorers Institute (which included science centers, public media & science advocacy org personnel)...**
 - | 14% of attendees' institutions have software tools in house for working with HDF data
 - | 23% have successfully ordered data via the EDG, while only 14% reported that the EDG meets their needs for NASA data
 - | 64% prefer to work with data in more familiar image formats, e.g. GeoTIFF, PNG or JPEG
 - | 46% said they would prefer it if NASA would develop another gateway tailored to meet the needs of formal and informal educators
- | **The EEI will be our community of NEO “tire kickers”**



Increasing use of MODIS images & data

Education

Simple Search

Simple Delivery

- | Images compatible w/ familiar tools
- | Upload into simple analysis tools; e.g. ICE
- | Geospatial browsers, e.g. World Wind
- | Ordering matching data in HDF



NEO Goals: Education

| **Education**

- | teach users about the products, parameters, and data formats
- | provide timely access to imagery in formats that educators can readily incorporate into their workflow; e.g.:
 - | formal education lessons that dovetail with curricula and standards
 - | science center exhibits and interactive programs
 - | facilitates amateur Earth observation, similar to amateur astronomy
- | provide dataset/parameter descriptions tailored to multiple audiences
 - | lay-person: general, high-level description authored by contributors to the Earth Observatory and/or science team members
 - | scientific description, including links to ATBDs
- | develop “How to” tutorials
 - | look at data: viewing NEO browse data; basic analysis
 - | basic data manipulation (tools for HDF and other formats)



NEO Objectives: Search

| **Simplified Search**

- | make query parameters easy to understand, and limit options
 - | leave complexity for advanced users and other interfaces
- | searching only a subset of all MODIS datasets/parameters
 - | selected for anticipated popularity, ease of comprehension
- | full-text, semantic searching of datasets and parameters
 - | user is not required to know the name of the dataset before beginning a search



NEO Objectives: Delivery

| **Simplified Delivery**

For users who want to go the extra step and download the source data:

- | NEO can store pointers to online datasets for direct download
 - | URLs provided by data providers
 - | links to data in DAAC data pools
- | order source data from DAACs via ECHO (EOS Clearing HOuse)
- | all delivery capabilities will be routed and administered through NEO
 - | no shuffling of users off to other sites unless absolutely necessary



What NEO Contains

- | **“browse data”**
 - | 8-bit grayscale, geo-referenced, Plate Carre-projected image
 - | future implementations might reference Web Mapping Services (WMS) hosted by providers; other apps that can quickly deliver remote imagery in a consistently known format
 - | definition could be expanded to meet need
 - | Exceptions will be true-color, surface reflectance, and albedo products, which may be better represented by greater dynamic range
- | **thumbnail image**



Global Data Products

| **Atmosphere Products**

- | Aerosol optical thickness
- | Fraction of fine aerosol
- | Water vapor
- Cloud fraction / cloud mask
- Cloud particle radius
- Cloud optical thickness

| **Ocean Products**

- | Sea surface temperature (day)
- | Chlorophyll concentration
- Water-leaving radiance

| **Land**

- | Land cover classification
- | Daily surface reflectance
- | 16-day albedo
- | Land surface temp (day & night)
- | Normalized Difference Vegetation Index
- | Leaf Area Index
- Snow & Ice cover
- Global fire maps



What NEO Contains II

- | **credit to participating data providers**
 - | Links to other sites, where appropriate
- | **spatial and temporal metadata**
 - | capable of ingesting and storing complex geospatial shapes for future missions
- | **customized content**
 - | multiple dataset descriptions for various user levels
- | **reference to offsite assets**
 - | ATBDs
 - | websites (dataset-, sensor-, platform-specific)
 - | other resources



Current Status

- | **prototype in development (“alpha” release)**
- | **working with selected data providers for developing and testing ingest processes**
- | **production server currently going through procurement**
- | **working with partners for server co-location, internet connection, and system administration**
- | **Exploring Internet2 connectivity**
 - | I’m told every school in Kansas now has I2 connectivity



Coming Up

- | **Establish production server**
- | **Begin to receive ingest packets from participating MODIS data providers**
- | **Create tutorials, dataset descriptions, other assets**
- | **Testing with users**
- | **Go live ~ June 2005**
- | **Outstanding question: Who best to host NEO long term?**

- | **Future additions**
 - | improved semantic search to assist users
 - | more comprehensive coverage of MODIS products
 - | expand to include other missions' data
 - | composite datasets from individual PIs